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MEMOIR,

TO ACCOMPANY

BLUNT'S CHART

OF THE

North Atlantic Ocean.

THIRD EDITION.

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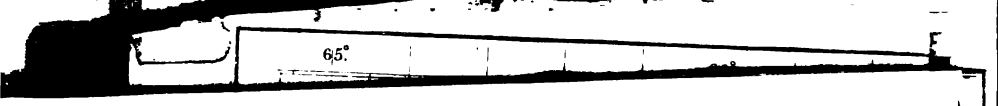

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MEMOIR

OF THE

DANGERS AND ICE

OF THE

North Atlantic Ocean.

George W. Blunt

THIRD EDITION.

NEW YORK:
E. & G. W. BLUNT,
179 WATER STREET, CORNER OF BURLING SLIP.

1848.

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PREFACE.

The compiler of this work has been indebted to the Nautical Magazine and Purdy's Memoir of the Atlantic, for most of the material used in its preparation. A few general remarks he feels bound to submit to the consideration of those into whose hands it may fall.

A great many of the expunged dangers have been reported on the ground that white or discolored water has been seen, and the rest has been inferred. We think it the duty of every shipmaster, when any of these indications are seen, that the deep-sea lead should be used. On this subject we substitute the opinion of a writer in the Nautical Magazine, page 599, vol. II.

To the Editor of the Nautical Magazine.

Sir—I was much gratified by observing a notice in your valuable work,* stating that Lieutenant A. Sainthill, in 42° 37′ N. and in 41° 45′ W., on observing the water discolored, had tried for, and found soundings on rocky ground, with a depth of 100 fathoms: as, also, by the opinion expressed by the Lieutenant, that soundings might be found from the meridian of 20° W. to the Banks of Newfoundland, because such opinion agrees with that I had formed from careful observation in June, 1828, and which I afterwards made public, under the head of "Supposed series of submarine banks from Newfoundland to the English Channel."†

During our run across this part of the Atlantic, the changes of color from the dark-blue of the deep ocean to shades of green,

* Nautical Magazine, No. 8, for October, 1832.
† United Service Journal, part i. 1830, p. 237.

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indicative of soundings, were so remarkable, that I was induced to reflect seriously on the probability that we were passing over, alternately, submarine mountain and valley, the general direction of which was north and south. This idea became more and more impressed on my mind, as, from close and unwearied observation, I at last convinced myself, that the effect was not produced by molusca, &c., or by the alternations of the weather; in fact, I was fully satisfied, that, whatever may have been the cause, the effect was not subject to alteration, as the following instance will serve to explain:—On three consecutive days the water continued of a green-blue tint, very different from the general color of the deep ocean. On the first day, we had a gale, a heavy sea, and sunshine, until the afternoon, when it became cloudy, with a steam-like vapor resting on the surface of the water: second day, no sun, very cloudy, but horizon clear; third day, cloudy until noon, when the sun shone forth bright; in the evening, hazy. The color of the water during the whole time remaining unchanged.

I have therefore great hopes, if navigators would persevere in trying for soundings between England and Newfoundland, that detached submarine banks might be discovered, which, their positions being accurately determined, would become, as it were, so many beacons in the ocean, giving the longitude to those vessels navigated solely by account. The voyage to and from North America in this route would be greatly facilitated, and these indicators would prove as convenient to the mariner as the milestone is to the traveler on the highway.

The subject being one of much interest, I may be excused for entering a little more into detail, in order to show the probability of the opinion being correct.

Philosophy informs us, that the colors of natural bodies arise from a quality, in virtue of which they reflect one component part of the solar ray more copiously than the others, and therefore affect the sight with the color so reflected. It seems obvious, therefore, that blue is the general reflected color of the ocean; and from its density near the surface being every where the same, it probably receives but one permanent color from above. Whatever different color is found in particular spaces of its sur-

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face, it may not perhaps be erroneous to assume, arises from some cause below; that is to say, from the nature of the bottom acting in conjunction with the light above. It may be remarked, however, that, although green-colored water betokens soundings, yet the bottom is sometimes found where the water is of a blue color: this probably occurs over rocky ground; it is observable at the Bermudas, where the water is extremely pellucid. It is well known, that the less vapory the atmosphere is, the darker is the color of the sky; on the contrary, the color of the ocean is darker when there are most clouds and other vapors in the air.

That various tints are often seen, particularly at sunrise and sunset, on portions of the ocean's surface, is admitted; but, if a person looks on the opposite side of the reflections which cause these tints, he will find the water immediately surrounding the vessel precisely of the same uniform color, whether of a blue or a green shade, as had been observed before the tints became visible.

With respect to the probability of the change from one color to another being occasioned by molusca, from the blending of their prevailing tint with the blue of the ocean, I was, from careful examination, satisfied it could not proceed from that cause. To those seamen who have had frequent opportunities of observing the particular tints of certain portions of the ocean, especially within the tropics, by molusca and crustacea, the distinction would at once be striking on observing them, and the spaces of green-colored water on which we are now treating: of the former, on the voyage in which I made the observations, I ascertained the fact by drawing up a bucket of water in instances where the fluid appeared of a brown and of a greenish hue, and found, according to expectation, that it contained thousands of minute animalculæ of those particular colors. During the passage across the Atlantic, I tried this often, and in every instance the water drawn up was clear as crystal. Although in countless thousands, the medusæ did not cover the surface so closely as to give a tinge to the water like the molusca I had seen in the tropical seas; indeed, we sometimes passed over a long space without seeing one; yet the water preserved its color. They were evidently more numerous in the green-colored water than in the blue, but thousands were also seen in the latter.

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I beg to be understood, that, in making this communication, I do not mean to attach any credit to myself, from having originated the idea before Lieut. Sainthill verified it, by obtaining a depth of 100 fathoms to the eastward of the Grand Bank, because it is extremely probable that many navigators may have formed a similar opinion long before my time, and, for aught I know, may have made such known publicly: undoubtedly, however, Lieut. S. is entitled to the praise of having determined, by practical proof, the probability of such an opinion being correct. My only ambition in this matter is, if possible, to be useful; it is enough, therefore, for me, Mr. Editor, to second you in directing the mariner's attention to a circumstance, which, if verified to the extent conceived, (or even less,) would become of the greatest benefit to us all.

AN ADVOCATE for the FREQUENT USE of the DEEP-SEA LEAD.

And to this we may add the following extract from a Journal kept by one of our most experienced and intelligent shipmasters, Captain W. Skiddy. If all who thought they saw dangers would but adopt the course he has, the number on the charts would be much diminished.

"When in command of ship Maria Theresa, in the year 1817, from Charleston, S. C., to New York, off Cape Hatteras, and near the edge of the gulf stream, a little before dark, observed breakers ahead, and what to us had the appearance of a sand-bank, of a yellow-brownish color, a little above water. We had at the time a fresh breeze with a considerable short swell, the spray of which was flying over the deck, and on the edge of the supposed bank breaking as on a beach. The weather clear, and knowing that no bank could possibly exist in this track, I determined to continue on sailing, then at the rate of 8 knots. On entering this patch, it became perfectly smooth, and as the ship proceeded through, it rolled up on the side like a thick oily substance about 6 inches in depth, showing the variegated colors of the rainbow. My opinion was that this substance probably was from some sick or dead whale; and had we not

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sailed through, but hauled up clear of it, no one would ever doubt its being a bank."

"June 14 and 15, 1839, ship Henri IV., N. Pacific ocean, two evenings passed through several remarkably white patches, which in the evening became much illuminated—we caught some in buckets, and found it would adhere to the hand and fingers, emitting a bright phosphorous light, which could be traced along the deck with the fingers; there appeared, however, on sailing through, some distance below the surface of the sea, a bright substance much larger, from which I conclude proceeded the smaller particles floating on the surface."

"This phenomenon I have only seen once previous, and that about 14 years ago, a little to the N. E. of our present position, latitude 9° N., longitude 90° W.; it had every appearance of shoal water; no bottom with 120 fathoms."

No doubt many of the reported dangers exist, as the difficulty of finding a rock or a reef so far distant from the land that there can be no mark or range, is too well understood by practical men to require remark; and even near the land such dangers escape too often: for instance, the Dollabarat Shoal, which is the father of Tulloch's Rocks and other dangers, was passed over by Tofino, and only recently placed right by Capt. Vidal, R. N.—And we have an instance in our own navigation, the most frequented part of it—that of Gangway Rock—in Long Island Sound. This rock, lying in the centre of a narrow passage, was not known or buoyed until 1818, when a vessel struck upon it, and the writer of this went down to determine its position.

But, on the other hand, there is a disposition to magnify and create dangers where they do not exist. Clumsy bearings, guess-work,* or over-estimated distances, make

* In the case of the Helen Reef, off Rockall, the master of the brig Helen, which vessel was lost on this reef, and gave name to it, estimated the reef to lie six miles from Rockall. Capt. Vidal, who surveyed it, makes it 1710 fathoms, being a little less than one nautical mile and three-fourths.

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many new shoals. See the case of the Bonetta Rocks—a vigia is reported; all hands are on the lookout for it; some think that something must be seen, *or they do not look out sharp*: a roller or breaker is seen—that is the danger, without examining whether it is over the carcase of a large fish or a partially sunken wreck or spar. It is then reported, and stands until some examination, such as has taken place within the last few years, is made, to settle the question. These modern surveyors certainly do diminish dangers in more ways than one.

For the most valuable portion of this Memoir he is indebted to his friend, W. C. REDFIELD.

G. W. BLUNT.

NEW YORK, *May*, 1848.

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DESCRIPTION

OF THE

Rocks and Banks of the North Atlantic.

1—TO THE NORTHWARD OF LATITUDE 50 DEGREES.

NUN ROCK, off Cape Rath, in lat. 58° 52½′, and long. 4° 56′ W.—This rock, with the adjacent bank, was surveyed, under an Admiralty order, by Captain Ramage, in the Cherokee sloop of war, 1817. According to Capt. R., from the centre of the rock, over which there are but 15 feet of water, at low ebbs, Cape Rath bears, (by compass,) S. 32° W. nearly 15 miles; Farout Head, S. 10° W., 18 miles; Whiten Head, S. 6° E., 21½ miles; the Stack, S. 85° E., 14 miles.

AITKINS' ROCK, N. W. Coast of Ireland.—Said to be in different longitudes, from 9° 53′ to 11° 14′ W., lat. 55° 15′ to 55° 19′, having only 4 feet water on it.

This, we think, does not exist. A most thorough examination was made in 1830, by H. B. M. gun-brigs Onyx and Leveret, directed by Capt Vidal, under instructions from Capt. Beaufort, hydrographer to the Admiralty, and it could not be found.

BRAZIL ROCK, said to be in lat. 51° 10′, and long. 16°, *does not exist.*

ROCKALL, lat. 57° 36′ 20″, long 13° 42′ 29″.—This is a large high rock, of a conical shape. Its position was determined, and the bank around it examined, by Captain Vidal, R. N., 1831.

North of Rockall, 83 fathoms, is a rock usually uncovered.

Helen's Reef bears from Rockall, N. 73° 28′ E., distant 1710 fathoms. It is very dangerous; as in fine weather, with the wind from the eastward, it only breaks at considerable intervals. It is visible at low water, neap tides, in the trough of the sea.

High water, full and change, 5h. 30m. Rise of the tide, 12 feet. The flood sets about W. by S. ½ S., true.

A bank, having on it from 85 to 192 fathoms, extends in a S.W. direction 125 miles from Rockall, and north from the rock 40 miles, 55 miles in width on the widest part.

LION'S BANK, in lat. 56° 40′, and long. 17° 45′.—This bank was sounded by Lieut. Richard Pickersgill, in the brig Li-

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on, in 1776, who found upon it from 290 to 320 fathoms. A vast quantity of sea-fowls were over it, and it probably abounds with fish. The position annexed is that given in the Requisite Tables. Dr. Forster, in his History of Voyages made in the North, says, "On the 29th of June, with 320 and 290 fathoms, Pickersgill found a sandy bottom, in 56° 38′ N., and 17° 44′ W., which induced him to call that spot *Lion's Bank;* and particularly so, as he found there, what is usually seen on all banks at sea, a vast quantity of sea-fowl, such as gulls, dumdivers, &c. Soon after this, he could no longer get any soundings, nor were there any more fowls to be seen. This bank is said to have been sounded on, a few years ago, by Captain Richmond, of Greenock.

The Western edge of the Rockall Bank is identical with, and probably the Lion's Bank, according to Captain Vidal. See the Chart.

KRAMER'S BANK, said to be in about 60° 57′ N., and 16° 40′ W., *does not exist.*

2.—BETWEEN THE LATITUDES OF 40 AND 50 DEGREES.

"The CHAPELLE BANK.—The French surveyors report that the Chapelle Rock, which is traced on several old charts, has long been the object of our ineffectual researches. We have found only, in the situation assigned to this rock, an insulated bottom, of small extent, having over it not less than 80 fathoms, and on which the sea may break in rough weather, but have little reason for believing that a danger exists hereabout.

"On the 30th of July, 1828, favored by fine weather, we traversed on the parallel of 47° 31′, at the rate of 3 or 4 knots, the horizon very clear, and the sea smooth. We lost bottom with 180 fathoms in longitude 6° 59′ 30″, at three-quarters past three a. m.; and thence continued to sound, in all directions, near the spot where the rock was said to exist. We at first obtained ground with the depth of 103 fathoms, but notwithstanding all our efforts we gained no less than 80, and this was in latitude 47° 33′ 47″, and longitude 7° 20′ 12″. The position of this sounding may be regarded as very exactly determined by lunar and chronometric observations.

"It was remarkable here, that, at several miles to the west of this bank, a portion of a lower mast was found, 20 feet long, covered with long sea-weeds and shells, which, from a distance, appeared like a rock even with the water. The weather was so favorable that, on an approach, the object was found to be really a piece of floating wood; but had the weather been otherwise, so as to have prevented examination, it might have been supposed to be a *vigia*, or rock, even with the water."

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CHAPELLE ROCK, 47° 43′ N. lat, 8° 4′ 30″ W. long.—This rock, which has been expunged, it appears, by the following fr. m the Nautical Magazine, has re-appeared:

Abstract from the Log of the brig Grace Darling, of Liverpool.—9th August, 1842. At 1h. 30m. p. m. breakers seen close to the vessel, and a sunken rock observed distinctly and repeatedly above water in the hollow of the sea, which clashed together and broke much. Supposed the rock might be about four feet below the usual sea level. It was witnessed by the whole crew of the vessel, which passed within her one length to windward of it, then going about 7½ knots. Supposed it to be the Chapelle Rock of 1786; its circumference appeared to be about 40 feet; it was of a sandy color like freestone, and no weed appeared on it. All on board were much alarmed. Latitude in, carried on from a good meridian observation, 47° 43′ N., and longitude reduced from chronometric observations at 9h. 30m. a. m. and 3 p. m. 8° 04′ 30″ W. The chronometer was No. 2050, by Mr. Henry Frodsham, from whom her rate had been obtained only nine days before, and its accuracy subsequently confirmed by excellent distances of sun and moon on the 27th August, and again by making Deseada on the 5th September. So the existence of the rock in the assigned position may be relied on. JAMES TASKER,

Master of the Grace Darling.

DEVIL'S ROCKS, in lat. 46° 35′, and long. 13° 7′.—M. Bellin, in his Memoir of 1742, noticed that, in lat. 46° 55′, about 110 leagues W. S. W. of Ushant, there is a rock even with the surface of the water, discovered by Captain Brignon, of the Constance, of St. Malo, in 1737. The *Devil's Rocks*, in lat. 46° 35′, and long. 13° 10′, according to M. Delisle, may be the same danger. These have been marked on many charts. They were particularly observed in 1764, by Captain Thomas, a respectable and intelligent navigator of Havre de Grace, from whose written communication, addressed to M. L'Abbe Diquemare, we find that, on the 23d of May, 1764, Captain Thomas observed at noon the latitude 46° 24′. The danger was discovered at the same moment, off the larboard bow, at a short distance, three feet above water, of a grey color, covered with moss, and about 40 feet in diameter. We formerly placed it, upon this authority, in latitude 46° 24′, estimating the longitude at about 13° 10′.

In a Liverpool Advertiser of the 5th of July, 1819, a note on these rocks was given as follows: "The Brothock, of Arbroth, Captain William Peter, on a voyage from this port to Rio Janeiro, on the 13th November, [1818,] while running with a fresh breeze from the N. N. E. at noon, observed a rock about 10 feet from the starboard quarter, about two feet under the surface of the water, in lat. 46° 35′ N., and the longitude, by mean of two

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well-regulated chronometers, 13° 7′ W. The water recoiled around it, and broke on the top. Its circumference appeared o be about 40 feet. The above rock agrees in latitude with the Devil's Rocks, which have been so long doubtful: its longitude differs a few miles only."

This rock was seen, a few years ago, by Captain Scott, of the cutter Voast; and again, at 4 p. m., on the 25th of April, 1829, by Captain Henderson, of the Fortescue, from Mauritius to London. The appearance, according to the latter, was that of a rock, of brown color, about 12 feet long, nearly as much in breadth, and about two feet above water. The latitude (at 4 p. m.) carried on from meridian altitude that day, was 46° 33′, and mean longitude, lunar and chronometric, from observations in the morning, 13° 2′ W. Captain Scott is of opinion that there are more heads of rock than one: that which he saw was like the point of a sugar-loaf.

The Devil's Rocks were seen, in 1829, by Captain Swainson, in the Fortitude, of Dublin, and described as in latitude 46° 35′, longitude 13° 8′. They were subsequently sought for and seen by a commander who has said that the water was seen breaking upon them very high, and as it receded the rocks were discernible: "We were going nine knots at the time, and had the wind not been very strong I do not think they would have been observed. In fine weather, I am of opinion, the water would not break upon them. I did not heave-to, when I neared them, to take an observation, but made one soon after, and from the distance we had run, I made them to lie in nearly the same position as that of the Fortitude."

In the Nautical Magazine of 1842, two different correspondents report *green* water, one in lat. 46° 12′ N., long 15° 3′ 30″ W., the other in lat. 46° 29′ N., long. 18° 29′ W. *Neither sounded.*

NEGRE'S ROCKS, lat. 48° 7′, long. 21° 0′, *do not exist.*—These rocks, said to have been seen in 1742, have been designedly omitted in the chart, from a conjecture that the back of a whale may have produced the appearance formerly described.

THE FIVE HEADS, in lat. 44° 15′, long. 19° 25′, *do not exist.*—Under this denomination the French chart of 1766 has a rocky shoal, some part above water, in latitude 44° 10′, and longitude 19° 25′. It is marked some minutes more to the north on the charts of M. Van Keulen. No account of it is, however, given either by him or Bellin: nor, although sought after, has any account of it yet been found. It seems that Bellin, in his charts of 1757 and 1766, has given it on the solitary authority of Van Keulen. We shall erase it from the charts.

GREEVE'S LEDGE, said to be in lat. 44° 15′, long. 25° 5′, *does not exist.*

WOODALL'S ROCK, near lat. 43° 20′, long. 25° 10′.—"Ship Indemnity, at sea, on her way from Demerary to Eng-

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land, 1829, at 30m. p. m. discovered a rock on her starboard beam, distant about three ships' lengths; the ship was then going at the rate of about two and a half miles an hour, with a heavy swell from the N. W. With each succeeding swell the rock was entirely covered, but at intervals it showed several feet above water, perfectly perpendicular. From the masthead, it was seen to a great depth below water, and appeared to be in the shape of a cone. At the preceding noon the latitude, by observation, was 43° 20′ N., and longitude, by chronometer, 25° 10′ W." *(Attested by the Captain, Mate and passengers.)*

AMPLIMONT ROCKS, in lat. 42° 30′, long. 24° 5′.—In M. Bellin's Memoir, of 1742, a danger is mentioned in latitude 42° 30′, and longitude 24° 5′, which was seen in 1735 by M. Guichardi, commander of the ship Dauphin, of Nantes. It has two points of rocks, separated, and 30 feet above water. He ascertained the height within a league of the danger, which appears to be the same as that called La Basse d'Amplimont, stated to be nearly in the same latitude and longitude.—We have given it the position originally assigned by the Memoir. Some Englishman has called it by the name of Edmund Knowle's Rock, by whom it is supposed to have been seen.

Extract from the Nautical Magazine, for October, 1842:—"On the 13th of May, I sailed from Paimbœuf for Quebec, with the wind at N. E. We had a fine run to long. 19° 44′ W. On the 23d of May, (at noon, in lat. 42° 31′ N. by two good observations, and long. 24° 3′ W.) at 7h. 20m. p. m., I passed a rock within two ships' length. When I first saw it, it was a little before the larboard beam, and appeared like a ship's anchor-buoy. When it came on the quarter, I saw the seaweed quite plain upon it, as did also the watch on deck. Another part of the rock we saw under water, about 8 or 10 feet from the rock we saw above water; at intervals it was covered and uncovered. We had not much swell on at the time; fine pleasant weather. At the time of passing the rock the ship was in lat. 42° 51′ N., and long. 24° 15′ W. The rock was seen a considerable time after we passed it. Wind at the time W. N. W., ship's head north, going 3 and 3½ knots per hour.

CHARLES WILSON."

THE THREE CHIMNEYS, in lat. 47° 54′, long. 29° 40′.—This vigia is said to have been seen on the 10th July, 1729, by Captain de Clas Fernel, who approached within two leagues of it; and who remained two hours in sight of it. This vigia appears to be one which a M. de Merry has mentioned. The charts vary with regard to its position, and its existence may even be considered as very doubtful.

This was the old authority; but Mr. Heron, of Greenock, in 1824, adds, "I am informed by the master of a merchant-vessel,

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that the Chimneys actually exist, for a whole watch as well as himself saw them. They were seen about twilight, and three heads were distinguished. From an observation taken at the preceding noon, it was inferred, that their latitude, as laid down on the chart, is very near the truth."

Capt. Roallens, of the brig Eagle, in the Nautical Magazine for 1843, reports that he saw it in July, 1842, four miles distant, making it in lat. 47° 37′ 22″, and long. 28° 51′ W. It formed in three distinct points, the highest 80 feet. [This is the notice to which Capt Skiddy refers.]

Extract of a letter to the Editor, dated November, 1844:—"Observing in the newspaper a notice that the Three Chimneys had been lately seen and *fully* described by an English ship, I think in '41 or '42, and by an American ship also some few years previous, I determined, first opportunity, to run for and, if possible, see this danger. In command of the Packet Ship Garrick two different voyages I had this opportunity, running by three chronometers, and having on both occasions clear, beautiful weather—the first time, steering in one parallel 60 miles, and about 10 miles south of the position laid down by the British Captain; and the second, about 10 miles north, and on each occasion nothing could be seen from the royal yard.

Yours, WM. SKIDDY."

MARINER'S ROCK, north of the Azores, lat. 46° 0′ N. long. 29° 37′ W. No soundings.—Extract of a letter from Mr. Swinton, master of the ship Mariner, from London to Miramichi, dated 11th of May, 1831:

"At 9 a. m. on the 20th of April, we had a very narrow escape of being lost. The ship was laid to the wind, under a close-reefed main-topsail and main-trysail, in a heavy gale from the westward, and a high sea, when we saw the sea breaking on something to leeward, not more than 50 or 60 yards from the ship, which we at first took for a vessel bottom upwards; but on nearing it, it could plainly be seen to be a large rock, about 60 feet in length, ragged at the top and high at one end, with weeds growing on it. We set the fore-trysail, and just cleared it not more than 30 yards' distance. By the observation at noon, and longitude by chronometer, it lies in lat 46° 0′ N. and long. 29° 37′ W. not laid down in the chart; and, I think, will only be seen when there is a heavy sea running; but we could see it very plainly in the hollow of the sea. The south end appeared to be the highest part of it. Sights were obtained for the chronometer at half-past 9, and the meridian observation was very good."

JAQUET ISLAND, said to be in lat. 46° 55′, and long. 39° 30′, *does not exist.*

BEAUFORT BANK, lat. 42° 37′, long. 41° 45′.—Lieut. A. Saintbill, R. N., commander of the ship Beaufort, on returning

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from Jamaica, August 3, 1832, when in lat. 42° 37′, and long. 41° 45′, observed the water to be discolored; in consequence of which he twice tried for soundings, and found rocky ground at the depth of 100 fathoms. Lieut. Sainthill is of opinion that soundings might be found from the meridian of 20° west to the Banks of Newfoundland. See, upon this subject, the Nautical Magazine, Oct. 1832, page 393, and Oct 1833, page 599.

DRUID'S REEF, in lat. 41° 19′, and long. 41° 25′.—On the 12th April, 1831, Capt. Treadwell, in the Druid, of London, passed this reef on his starboard hand, at not more than 30 yards distant. The weather was calm, and he had taken a good meridian altitude, whence the latitude was assumed as above, with the longitude by a chronometer, which has always proved correct. The reef had the appearance of from seven to ten sugar-loaf heads, and its length from E. N. E. to W. S. W. was estimated at 10 to 14 feet. It was about three feet above water.

The reef was heretofore inserted from the late Spanish chart, as seen in 1803, lat. 41° 24′, and long. 41° 20′; but we are not acquainted with the authority under which it has been there introduced. It may possibly be a rock, said to be seen by Desmaries, a pilot, in 1683, who reported that it appeared at the height of a sloop above the water. Bellin assigned to this danger lat. 42° 0′, and long. 41° 10′. The Spanish chart also exhibits another vigia, said to have been seen in 1798, lat. 43° 30′, long. 37° 35′. Most likely to be of ice only.

HERVAGAULT'S BREAKERS, in lat. 41° 2′, and long. 49° 23′.—We have shown the situation of these breakers on the chart, although it has been the opinion of many experienced navigators that no danger exists here; and that masses of ice seen in these places have been mistaken for rocks. They were inserted originally upon the authority of M. Hervagault, commander of Le Conquerant, of Nantes, 26th of June, 1723; who described them as composed of two parts, between which he was forced to pass; being, when he first perceived them, at a cable's length from the one, and not more than an eighth of a league from the other. The sea between was very clear, and broke heavily upon the dangers. In a manuscript at the French Depôt Marine, there are these additional particulars: "The shoal, within a cable's length of which he passed, is a rock, which showed itself after the sea had broken upon it. On the other danger the sea broke in three different places, and between each it appeared very clear."

Again, on the 12th of May, 1827, Captain Maxwell, of the ship Home, on his passage from Liverpool to New York, fell in with three sunken rocks, with a tremendous sea breaking on them, apparently from four to six feet under the surface, in lat. 41° 2′ north, and long. 49° 23′ west, and about 30 feet in circumference, the last of them tailed off to the north-eastward with

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a long ledge. Captain Maxwell says, "I would have sounded immediately, but being just dusk, and the ship under a press of canvas, prevented me. The air at the time was 63°, and one hour before we perceived the danger, I tried the thermometer at the depth of two fathoms, and found it to be 45°; an hour afterwards I tried again, and found it 60°. The above information I have conceived it my duty to give you, being aware that many of my seafaring brothers must have suffered on this fatal spot; although from the first of these rocks to the last was within one mile. Winds, at the time, W. S. W., ship's head N. W., going 7½ knots per hour. The chronometer I have with me can be depended upon to one mile, and the latitude and longitude I have given is correct." This shoal is the Hervagault's Breakers of the French charts. In 1816 it was seen by Capt. Lourp, of the brig Alexander Savage, who places it in latitude 41° 6′ 23″ N., and longitude, by dead reckoning, 49° 57′.

We have expunged Hervagault's Breakers from the chart, believing as we do that the Breakers were caused by ice transported there by the polar current, and sufficiently submerged for the water to break entirely over it.—*Am. Ed.*

DARAITH'S ROCK, lat. 40° 50′, long. 54° 53′, *doubtful.*—The same opinion has been entertained of this as of Hervagault's Breakers. M. Bellin, however, placed it as a certain danger; and, in his Memoir of 1742, has said that this danger was seen on the 22d of August, 1700, by M. Daraith, who approached within a league and a half of it, then sailed round it, in order to observe it well, and took an altitude within sight of it. The rock is described as extending a league and a half, being three-quarters of a league broad. Its longitude is very uncertain.

WATSON'S ROCK, lat. 40° 18′, long. 53° 40′, *doubtful.*—Extract of a letter from Captain T. A. Watson, of the Harbinger, dated Liverpool, 22d July, 1824:

"Perhaps you may have seen, in some of the newspapers, a notice respecting a rock seen by me in April last, on my passage from this port (Liverpool) to St. John's, N. B. The following are the particulars:—April 20th, at 8 a. m. being on the starboard tack, ship going 2½ knots an hour, moderate weather, a man saw something a-head: the helm was immediately ordered a-weather to clear it, being very near it; ship was only 15 or 20 fathoms to leeward of it, which enabled me to distinctly make it out to be a rock just even with the water; its head was round, and appeared to be about three fathoms or more in diameter; it was covered with weed, similar to that on half-tide rocks; it was of a light green, with some branches of a red color. It was, at times, on the top of a sea, invisible; but, in the hollow of a sea, several feet uncovered. I observed the sea to break on it twice, causing a spray, as any pinnacle-like substance,

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with deep water around it, might be expected to do. My first officer and others also saw it, and are fully convinced of its being a danger; the lead was hove as soon as it could be got forward, but there was no bottom at 90 fathoms perpendicular. I might then be within musket-shot of it; from the mast-head, no appearance of other danger could be seen.

"From an excellent observation at noon, I consider it to lie in lat. 40° 18′ N., long., by dead reckoning, 53° 40′ W."

VIRGIN ROCKS, lat. 46° 26′ 30″ N., long. 50° 57′ 30″ W.—His Majesty's sloop Inspector was anchored about one hundred fathoms to the north-east of the shoalest part of the rocks, in the above position. The observations were made with a circle by Worthington and Allen, and two chronometers, the latter with a rate six days old from Halifax. Their meridian distance from Halifax was found to be 12° 42′ 6″ E., and the longitude of the rocks depends on Halifax dock-yard, which is supposed to be in 63° 38′ 41″ W. of Greenwich. The Inspector lay at anchor forty-eight hours, during which time the above result was obtained from a series of observations with a well-defined horizon and favorable weather.

Mr. Rose describes the rocks as extending in an irregular chain or cluster, 800 yards, in the direction of N. E. by E. and S. W. by W., their breadth varying from 200 to 300 yards. They were distinctly seen under water, particularly a large white mass of rock, in 4½ fathoms, having 5 and 6½ fathoms round it. The shoal was traced in 7 fathoms, on detached rocks, near the edge of it, having deeper water between them. On the southern edge of the shoal, from S. E. to W., the depth increases gradually to 30 fathoms, at the distance of half a mile from the shoalest part. The same depth was found to the N. W. and N. E. of the shoal, at the distance of one-third of a mile, and also between N. E. and S. E. at the distance of one mile.

The bank on which the Virgin Rocks are situated, was found, by Mr. Rose, to extend four miles and a quarter, in an E. by S. and W. by N. direction, and two miles and three-quarters in its broadest part, the depth being regular from 28 to 30 fathoms. Beyond these limits, the depth increased suddenly to 39 and 43 fathoms. The current was found setting to W. S. W. at the rate of one mile per hour over the shoal, with a confused cross swell.

The Manly, whilst at anchor on the bank, was obliged to strike her top-gallant masts; and the swell was so considerable, that the vessel rolled the muzzles of her guns under water. The Manly remained at anchor one night, and, on getting under way in the morning, the chain cable broke in the middle, owing, it was supposed, to the violent friction which it had undergone against the rocks. In an easterly gale, which would be attend-

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ed with the whole swell of the Atlantic ocean, no vessel could pass over these rocks. They lie in the direct track to Cape Race, Newfoundland, the point which vessels, bound to Quebec, generally endeavor to make.—*Nautical Magazine, Jan.*, 1832.

SHOAL ON THE BANKS OF NEWFOUNDLAND.—"A shoal with only 21 feet water upon it was discovered by Jesse Ryder, master of the fishing schooner Bethel, (belonging to Province Town, Massachusetts,) on the Grand Bank of Newfoundland, in lat. 46° 30′, having observed on the shoal and saw distinctly, it being a rock of about 100 or 200 feet surface; supposed it to be about 50 miles east of the Virgin Rocks. Shoal bears from Nine Fathom Bank S. by W. by compass about 1½ mile; discovered it accidentally while searching for the Nine Fathom Bank, to fish on. Am certain it was not any part of the Virgins; for I afterwards saw them, and from my experience of the different fishing grounds, know this shoal to exist."

CASHE'S LEDGE.—The position or extent of this shoal is not accurately determined. It was searched for recently by Capt. Owen, R. N., three times, without success. From the best information we can get we give the following:

East by compass 17 to 18 leagues from Thacher's Island you get soundings upon the Fippanies, a bank of 8 or 10 leagues in extent from north to south, about six miles wide in the centre and the northern end; on the southern end it is two to two and a half miles wide. The depth varies from 27 to 46 fathoms, shelly and pebbles.

From the eastern edge of the Fippanies east 4 to 5 leagues, will bring you upon Cashe's, on the shoal ground, which is on the eastern edge of the Bank: and is a flat white rock of from 200 to 300 feet in extent. Upon this rock there are four fathoms water.

South of the flat rock there is a gully, 90 fathoms water, which runs in upon the Bank in a S. westerly direction. Upon the south side of this gully, three miles south of the flat rock, there is a shoal of 7 fathoms, from which the soundings run suddenly to 15 and 30 fathoms on all sides except the east, where it deepens suddenly to 80 fathoms.

N. by W. 9 miles from the flat rock there is another shoal of 14 fathoms; between this and the flat rock there are from 10 to 35 fathoms, rocky bottom: on the rocky bottom there is kelp of 45 feet in length; on the flat rock there is none.

The above bearings and distances place the shoal or Flat Rock in 69° 03′ W. long., 42° 44′ N. lat. (See Chart of the N. E. Coast U. States, published by E. & G. W. Blunt. The old position 43° 04′ north, long. 69° 11′ west.)

NANTUCKET SHOALS, extending from Nantucket Island.—These very dangerous shoals have been represented as

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extending nearly half a degree to the southward from the S. E. end of Nantucket Island: but it has been found, by a survey, (1819,) made at the expense of Mr. E. M. Blunt, of New York, that they are by no means so extensive as they have heretofore been represented; and that the southern extremity of the old shoal, with 9 fathoms of water, is in about 40° 57′ N., and 69° 58′ W.

NEW SOUTH SHOAL.—This dangerous shoal was discovered and surveyed by Lieut. Charles H. Davis, U. S. Coast Survey. It has on it only 8 feet in places, and bears from the middle of the Old Shoal from S. 3° 28′ W. to S. 16° 42′ E., by compass, distance $6\frac{4}{10}$ miles. It is $2\frac{3}{10}$ miles long from east to west; and its greatest breadth, from north to south, nine-tenths of a mile.

Between it and the Old Shoal there are from 4 to 18 fathoms water; but to the north and east there are ridges of only 20 to 24 feet water, to the extent of about three miles from the New Shoals. Lt. Davis states that deep water intervenes between these ridges, and the soundings on the ridges were very irregular.

The tide rips showed that two, and perhaps three, lines of shoal ground are near each other, in parallel directions. The latitude of the centre of the New Shoals, is 40° 57′ 50″ N., longitude 69° 51′ 40″ W., and bears from Sankaty Head, S. S. E., $19\frac{1}{2}$ miles.

GEORGE'S SHOALS.—These shoals, which were laid down in different positions on all the old charts, were originally surveyed in 1821 at the expense and suggestion of Edm. M. Blunt, by Edmund Blunt; Commodore Isaac Hull assisting with the loan of a vessel to accompany the Orbit. Since that time an extended and minute survey has been made by Lieut. Charles Wilkes, U. S. N., under an act of Congress, whose position of the shoals does not vary materially from those of the Orbit. For the full report, see Am. Coast Pilot, 15th edition, page 130 to 131. From Lieut. Wilkes' report we take the following:

"The shoalest water found on any part of the bank was $2\frac{1}{2}$ fathoms, or 15 feet, reduced to low water; and this is only to be found in two small places, viz.

Lat. 41° 40′ 13″ Long. 67° 44′ 10″
Lat. 41 40 33 Long. 67 44 30

"The whole of the shoal is composed of hard sand and spits —fine sand on the shoalest places, and coarser as the water deepens, until it becomes large pebbles without sand."

"The rise and fall of tides is 7 feet, extremely regular, the first part of the flood setting N. N. W., the latter N. by E., and ebb S. S. E. and S. by W. The flood runs $4\frac{1}{2}$ hours, ebb $5\frac{1}{2}$ hours; greatest velocity two and six-tenths of a mile, from half an hour to two hours in changing, going round with the sun on

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from north by way of east. The wind has but little effect on the velocity. High water, at full and change, at 10 o'clock 30 minutes. Variation of the compass 8° 15′."

LITTLE GEORGE'S BANK.—By a letter from Ezra Taylor, for which we are indebted to Capt. Josiah Sturgis, it appears there is a shoal with 5 fathoms, which breaks heavily in bad weather, in lat. 41° 11′, long. 68°. Capt. Taylor has anchored on it three or four times.

3.—BETWEEN THE LATITUDES OF 30 AND 40 DEGREES.

DÆDALUS ROCK, off Cape St. Vincent, in about 36° 30′ N., and 9° 16′ W.—The old charts of the Atlantic indicate a danger at the distance of 12 or 15 leagues to the S. W. of Cape St. Vincent. This danger was omitted in the French chart of 1786, and subsequently in other charts, from the supposition that, if it really existed, it must have received some modern confirmation. But it seems, from information communicated by Captain Taylor, of the brig Laurel, of Whitby, that, in about 1813, the Dædalus, transport, struck on the rock, and received so much damage, as rendered it necessary for her to put into Lisbon for repairs.—Captain Taylor was in the fleet when the Dædalus struck.

Added to this, the brig Briton, Captain Stokes, was lost, in consequence of striking upon the rock, in December, 1821. After she struck, she swung off, and then immediately tried for soundings, but got none. On finding the vessel sinking, the people took to the boat and were picked up by another vessel. Captain Stokes had not seen Cape St. Vincent, but supposed it, at the time, to bear N. N. E. ½ E. 28 or 30 miles. This information has been communicated by Captain Livingston, who says, "This information was given to me in Malaga, in September, 1822, by Captain T. Tankersly, of the schooner Lord Mulgrave, of London. Captain T. added, that he had met with another master, (name forgotten,) who said he had observed the sea-weed on this rock; got out his boat, and held on by some of the weed. He supposed the rock to be about 50 yards in circumference."

The preceding information is from Captain Livingston, who also says, "I was some years since informed by an old man of color, a native of Goa, who was steward of a vessel I then commanded, that, while he was cabin-steward to Sir Edward Pellew, while captain of H. M. ship Indefatigable, she struck on a rock off Cape Finisterre. This, I understand, has been denied, and it appears truly; for I have now information on which I can rely, from a very respectable naval officer, whose name I do not consider myself at liberty to mention, that the Indefatigable,

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when commanded by Sir Edward Pellew, actually struck on the rock, or a rock, off Cape St. Vincent, and received some damage. I had no doubt, before, that she had struck somewhere, as I had perfect confidence in my old steward's veracity: the error was in memory only." *(Letter, 28th Oct.*, 1822.)

The existence of this rock was confirmed on the 6th of March, 1839, by Mr. John Aves, commander of the schooner Tantivy, of Plymouth. At 9h. 30m. p. m. this vessel, on her voyage from Zante, passed close to the eastward of it; it was not seen till close aboard, and not avoided without difficulty. There was a swell from the N. W. breaking over it, and a sheet of foam, about 20 to 25 fathoms in circumference. The Tantivy stood in N. N. E. on the starboard tack, till 7 next morning, then tacked to the southward, passing the Cape at the distance of about two miles. The rock was thus estimated to lie considerably to the eastward of its position as shown by chart, and to bear about S. S. W., true, 37 or 40 miles from the Cape.

FALCON ROCKS, to the northward of Porto Santo.—Least water 4½ fathoms, 8 miles N. N. W. from the N. E. point of Porto Santo.

The EIGHT STONES, to the northward of Madeira.—Said to be between the latitudes of 34° 30′ and 34° 45′, longitude 16° 40′ W., *do not exist.* A full examination has been made of the different places in which it has been located by several British men-of-war and surveying vessels, at different times, and no trace of the shoal could be found. See the plan and tracks in the Nautical Magazine of July, 1837.

Captain Fitzroy, R. N., says, "on the 3d of January, 1832, we were occupied in looking for the Eight Stones; but nothing was seen to indicate either rocks or shoals, or even shallow water. The sun was shining brightly on a deep blue sea of one uniform color; no soundings could be obtained; and had there been a shoal or rock within seven miles of us at any hour of that day, it could not have been passed unnoticed. So many vessels have searched, in vain, for this alleged group of rocks, that their existence can now hardly be thought possible." *Voyage, Vol.* II., 46.

JEAN HAMON'S ROCK, said to be in lat. 36° 54′, long. 19° 49′, *does not exist.*

WHALE ROCK, said to be in about lat. 38° 46′ long. 25°, *does not exist.*

TULLOCH REEF, said to be in about 37° 27′ N. and 24° 45′ W., *does not exist.*

FORMIGAS and DOLLABARAT'S SHOALS.—From the survey of Captain Vidal, H. M. ship Styx, it appears that the Formigas are placed three miles too far to the westward on the charts.

Dollabarat's Shoal bears from the Formigas, S. 44° E., true,

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distance three and a half miles, and is in latitude 37° 13′ 30″ N. Captain Vidal says, "We anchored close to it, and scoured the ground with our boats. It is a fearful danger, the least water we found on it was eleven feet, at low water. It is also a most insidious danger, only showing itself when there is a high swell or sea."

"We searched in vain for Tulloch's Rocks, and I think he saw the Formigas, and the shoal connected with them, and none other."

ST. MARY'S BANK, reported on the authority of Captain Livingston, who saw white water, *but did not sound.*

JOSYNA ROCK, in lat. 31° 40′, and long. 23° 45′.—On this danger it has been stated that the Josyna, of Flushing, was lost in August, 1697. The latitude observed, and the distance 110 leagues from Madeira. In the last Spanish chart, it is said to have been seen in the year 1805. This places it in latitude 31° 40′, longitude 23° 45′, as above, the position in which it will be found in the chart.

CHANTEREAU'S SHOAL, in lat. 38° 16′, and long. 39° 49′.—This shoal, which has been described as a white rock, was seen by Captain Chantereau, of the ship L'Auguste, in coming from Martinique, 6th September, 1721, when the sea broke on it very much. It was again seen by Lieut. Edm. Scott, commanding the Princess Elizabeth Packet, 24th April, 1828, and that gentleman has given the following account of it: "On the 24th of April, 1828, at 3 p. m., I came on deck, and immediately observed the water around the ship very green, and with every appearance of being in soundings; and on looking before the starboard beam, saw under water, at the distance of two cables, what evidently appeared, to the master and myself, to be a white sand-bank or rock, which the water did not then break on, but it appeared so very plain that there could not be much water on it. In extent it was about one or one and a half cable E. by N. and W. by S., true, and about half a cable in breadth.

Immediately on observing the shoal, I ordered the lead and line up; but, ere it was ready, the color of the water had changed to a deep sea-blue, when it was evidently useless to sound. At that time we were about a mile from the white spot; we had, at the time, a good breeze, but very little swell of the sea. I obtained two sets of lunar distances the day before; and at noon on the 23d had taken myself, with a sextant, the meridian altitude very particularly, in order to obtain the time correctly for lunar distances, on the opposite side to those previously taken, and which I did obtain, and made the latitude of the shoal 38° 16′ N., and by the mean of the lunars, which differed very little, 39° 48′ 49″ W. Owing to a defect in my chronometer, I was not enabled to bring forward the longitude by it, but every care and attention in my power has been taken to give its correct situation."

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BRETON'S ROCK, about lat. 39° 40′, and long. 41° 35′.—This shoal, according to M. Bellin, was seen by Breton, a pilot of Rochelle, who marked it merely as a rock. Laisne, another pilot, has also placed it in nearly the same latitude and longitude. It may be the same as that which Roland, a pilot of Tremblade, sounded; and also seen by Jean Desmaries; there being scarcely 10 minutes difference in latitude, and in longitude not more than a degree. The situation originally assigned was 39° 45′ N., and 41° 25′ W.

This danger was again seen in 1816, by the ship Tiger, on her passage from Barbadoes to Liverpool. The letter of a passenger states that, "on the 14th of March, at 10 a. m., a smart breeze from the S. W., with studding-sails set, going 7 knots and a half an hour, steering E. by N., true, in lat 39° 40′, long. 41° 40′, we passed over a very agitated rumbling sea. Under our starboard bow, in appearance about the circle of a mile, was a small field of dark brown rock-weed, apparently a confirmed fixture: entangled with the weed were two pieces of spar, seemingly very much decayed. I am positive that this is a danger which ought to be carefully avoided by all ships coming to Europe from the West Indies and America, as it lies directly in the track." (*Newspaper*, April 15, 1816.)

We are still at a loss for the position of the shoal; as it does not appear to have yet been correctly ascertained.

MUNN'S REEF expunged on the authority of Com. R. Owen, R. N., who searched for it in vain in 1835.

POTOMAC SOUNDINGS, lat. 38° 10′, long. 67° 25′.—On the southern side of the Gulf stream, in the situation given above, soundings at 90 fathoms were found by Captain Smith, in the ship Potomac, of Alexandria, U. S., June, 1838, as shown in the chart.

BERMUDAS.—These are fully described in the American Coast Pilot. A cast iron lighthouse, 365 feet above the level of the sea, containing a revolving light, has been erected on the island, on Gibbs' Hill.

The dangerous rocky reefs extend, in some parts, eight leagues from the islands, and render them very difficult of access. What renders the approach more dangerous is, that the land is low, and the currents around are variable.

The banks to the S. W. were surveyed, in 1829, by the officers of H. M. sloop Columbine; according to whom the northern extremity of the Inner Bank lies in 32° 6′ N. and 64° 53′ W.; the S. W. in 32° N. and 65° W. The least water found was 29 fathoms, corally and rocky bottom. On the edges are 40 fathoms. To the S. W. of this bank is another, called the Outer Bank, the N. E. end of which is in lat. 31° 59½′, long. 65° 2½′; the S. W. end in 31° 57′, and 65° 5′. The least water found on this bank was from 33 to 47 fathoms, rocks and coral.

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NYE'S SHOAL, said to have been seen in 1826, in lat. 31° 15′ long 55° 50′.

This we place among the doubtful, as Captain Nye reports he saw it at night.

4.—BETWEEN THE LATITUDES OF 20 AND 30 DEGREES.

GOMBAUD'S ROCK, in lat. 23° 15′, and long. 32° 25′.—According to M. Fleurieu, this danger was first seen in 1764, having been discovered by Gombaud, the commander of a merchant vessel of Rochelle. Upon this authority, *and this alone*, it has been continued, and its existence is, therefore, doubtful.

MOURAND'S BANK, in lat. 24° 34′, and long. 65° 10′.—This danger was discovered by Mourand, commander of the Prince de Nizarre, of Nantes, on the 6th of April, 1773. This person has the character of having been an intelligent navigator and accurate observer. He describes it to be "a bank of red sand, many parts of which are out of water, like detached islands, over which the sea breaks: it appeared to extend about a quarter of a league from north to south." The Journal of Captain Mourand's voyage having been submitted to the consideration of Messrs. Verdun, Borda, and Pingre, they have been enabled to calculate, with every probability of correctness, its true position.

GUIGOU'S BANK, in lat 20° 50′, and long. 66° 45′.—M. Bellin, in the Memoir of his Chart of 1742, describes this to be "a rocky bank, about 45 leagues to the northward of Porto Rico, upon which a Dutch vessel was lost in 1701, and that it had also been seen by a French vessel." Another manuscript, in the Depôt de la Marine, confirms this account, and adds, "The commanders of both vessels declare, that a little island of sand appears on the middle of the bank, in latitude 21° 24′, and that the bank is 3 leagues in length. It also appears, from the deposition of Christopher Whipple, commander of the Anna, of Rhode Island, that he was wrecked on the 17 of November, 1733, upon a shelf, from 30 to 40 leagues to the northward of Porto Rico; which, there is little doubt, must be the same. In the Marine Depôt of Paris there is a manuscript entitled, "Plan of the Shelf which was discovered by Capt. Michael Guigou, of Seine, in Provence, on a voyage from Cape François, in the ship La Concorde, February, 1688." On that plan it is placed at 45 leagues to the northward of Porto Rico, somewhat nearer to the western than to the eastern end. It has been subsequently represented in different situations. That given above is the probable mean.

INGLEFIELD BANK, in 29° 42′ N., and 80° 17′ W.—This bank, lying about 66 miles east of St. Augustine, was dis-

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covered by Captain S. Hood Inglefield, on the 26th of May, 1810, in latitude 29° 42′ N., longitude, by account, 80° 12′; by chronometer, 80° 17′, and by lunars, 80° 18′. Sounded in 25 fathoms, black sand; hence, steering N. by W. ½ W. course, made good, had regular soundings, 24, 25, and 27 fathoms, speckled sand and broken shells, until 6 p. m. on the 27th, when no bottom could be found. Noon, on 27th, lat. 30° 5′ N., long. by account 80° 25′ W., by chron. 80° 25′. On the 26th the current set W. N. W. one mile an hour: at 4 p. m., on 27th, no current. On the 28th, in lat. 31° 5′, and long. by chronometer 79° 46′, current ran N. N. E. 1¼ mile an hour.—*Communicated by Lieut. Jn. Evans*, R. N.

5.—VIGIAS BETWEEN THE EQUATOR AND THE PARALLEL OF 20 DEGREES.

HANNAH'S CORAL SHOAL, lat. 10° 7′, long. 27° 32′.—This shoal was discovered by Captain Thomas Fanning, of the brig Hannah, on the passage from Rio Janeiro to Trieste, June 25, 1824. It appeared to extend 150 fathoms, N. E. and S. W., with two branches or arms from it on the N. W. side, and one on the S. E. side. Sounded in 15 fathoms, granulated coral, on the S. W. part, but supposed it much shoaler on the N. E. points, as the weed was plainly to be seen, from the mast-head, on the surface of the water. Its latitude was found to be 10° 7′ N., and longitude about 27° 32′ W. The latter was deduced from lunar observations taken the day before; but as a strong westerly current (the equatorial) was experienced, it cannot be depended on within 20 miles. The latitude may be considered correct.

MARIA AND BONETTA ROCKS,* MADELINE REEF, WARLEY'S SHOAL, FRENCH SHOAL, CÆSAR BREAKERS, BOUVET'S BANK, &c.—Extracts from a letter, addressed to the Secretary of the United States' Navy, by Lieut. Charles Wilkes, commanding the South Sea Surveying and Exploring Expedition, and dated on board the sloop Vincennes, at Rio Janeiro, Nov. 27, 1838:

"It will be presently seen that the squadron effected the examination of the supposed position of ten or eleven shoals or dangers, the detailed accounts of which were formerly given in this work, their assigned positions in the charts, and the non-existence of which has apparently been proved. The search, in the first instance, was for St. Anne's Shoal, long since expunged, and which, of course, was not found; but hereabout

* On the subject of these rocks, which are no doubt the Hartwell Reef, see vol. x, p. 816, vol. xi, pages 46 and 753 of the Nautical Magazine.

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they fell in with a large cotton-wood tree, 120 feet long and 15 in circumference, which was, at first, reported as a shoal, and with a rough sea, in passing, it might have been mistaken for one." Commander Wilkes says, "I have little doubt but similar trees have occasioned the frequent reports of vigias or shoals being in existence hereabout. Our position at this time was in latitude 37° 0′ 37″ N., and longitude 40° 41′ 54″ W., and where any floating bodies drifted by the Gulf stream would probably have been deposited, as here is little or no current, and that variable."

"The first reported shoal laid down on our route upon the charts was the Maria Rock, in latitude 19° 45′ N., and longitude 20° 50′ W., which we stood for, and hove-to near the position, until we had ascertained our situation correctly, by careful observations. The vessels were then spread, and the course marked to run directly over the spot; the surface of the ocean, visible at the time from the squadron, was not less than 60 miles in circumference, with every opportunity which the clear weather could afford, and sufficient swell of the sea to have caused breakers on any shoal within 15 feet of the surface. Nothing, however, was discovered, and no bottom could be found with 300 fathoms of line.

"The next position examined was Bom Felix Shoal, said to be within 30 miles of the Maria Rock: this was searched for in the same manner, but were equally successful. We then stood for the place assigned to the Bonetta Shoal, to the eastward of Bonavista, said to be in latitude 16° 32′ N., and longitude 20° 37′ W. We in like manner hunted for this, and, after exploring the locality of its position on the chart, I steered on the course of its reported bearing, E. by N. from Bonavista, until nearly up with the Hartwell Reef, lying in sight of Bonavista, which has, without doubt, been taken for, and reported as, the shoal called Bonetta.

"Our inquiries at St. Iago assured me that the Madeline (the vessel last wrecked) was cast away on the Hartwell Reef, which has been reported as the Bonetta Shoal.

"I am well satisfied that the positions assigned to the above three shoals on the chart, and their vicinity, are free from all dangers. I am of opinion, also, that the particular and indefatigable search made by Captain Bartholomew, of H. M. S. Raven, and the opportunities afforded me of covering, with the squadron of five vessels, so large a space, at the same time, ought to be sufficient evidence that no such dangers exist as they are laid down in those positions, and should cause them to be obliterated from the charts.

"From Port Praya we steered for Patty's Overfalls, as laid down in the chart, in latitude 11° N., and longitude 24° 30′ W., and had a good opportunity of examining their locality. A few

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rips were observed within a degree of the situation assigned them, but little or no current was found; and I feel confident in asserting that no danger exists in this vicinity, as we were becalmed in the position, and in close proximity to it for 48 hours, the squadron as usual being spread apart, and having a broad expanse of ocean under view. Owing to contrary winds it was some days before we reached Warley's Shoal, said to be in lat. 5° 4′ N., and long. 21° 25′ W. This point was also carefully examined, but no shoal, or appearance of shoal water, or any danger, discovered.

"Our next examination was of a French shoal, said to be (as laid down) in latitude 4° 5′ N., and longitude 20° 35′ W. This was also examined, and no danger or appearance of shoal discovered. From this point I took advantage of the southerly wind, and proceeded east; which carried me as far as 13° of west longitude, and over the position assigned to the shoal by the French hydrographers, to enable me to cross the equator eastward of the 17th degree of west longitude. We succeeded in crossing the equator in that longitude on the 5th of November, and then stood for the Triton's Bank, said to be in latitude 0° 32′ south, and longitude 17° 46′ W. When within a short distance of its position the squadron hove-to, for the purpose of ascertaining our position accurately; after which a course was steered nearly west. Being at the time well to the eastward, we ran on a line due east and west over it; the vessels of the squadron being spread about three miles apart, on a line north and south. We did not, however, find it in our progress, or any bottom or indications of soundings; no *discoloration* of water was visible, or change of temperature, although the line extended 30 miles east and west of its reported position; after which we again stood to the north, and ran over a vigia as laid down on the charts, but none such was found in existence.

"Our next examination was for Bouvet's Sandy Island, which was, in like manner, carefully searched after, in and around its position, as laid down on the charts, but our search was equally successful.

"Finally, search was made in and about latitude 2° 43′ S., and longitude 20° 35′ W. Extending to the N. N. W. of this point a distance of 30 miles hereabout, having been assigned as the situation of the sub-marine volcano reported by Admiral Krusenstern, which it was supposed might have left a shoal. This locality was twice run over in different directions, and carefully examined, with the squadron in open order, but none such was found in existence."

"Lieut. Hudson, of the Peacock, having separated from me on the 16th of October, proceeded on a different course in search of the same shoals which we were looking for, but was equally

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unsuccessful in finding any, as appears by the following extract from his report to me, which affords further evidence, if it were needed, of their non-existence:

"Having separated from you on the 16th of October, it was not until the 23d that I had worked up to the Warley's Shoal; and at eight o'clock that night I was directly on the spot where it was laid down on the chart. We placed good look-outs, and kept our patent lead going for 50 miles before reaching the location of this shoal as laid down on the chart; also observing our drift at night, in hope of sweeping over it at early day-light. I continued cruising in this vicinity in various directions, getting casts of lead in from 50 to 100 fathoms, without finding bottom. I now continued my examination, and after having swept over a circle of 40 or 50 miles in different directions, am perfectly satisfied that Warley's Shoal exists no where in the neighborhood laid down on the chart.

"I then proceeded for the French Shoal, with the wind a-head, (S. by W.) where I arrived on the 25th of October, and continued cruising all the following day, with a fine breeze, immediately over the location of the shoal as laid down, and in every direction for miles in its vicinity. After thus thoroughly searching the *English* locality of this shoal, I directed my course for the French position, 76 miles distant, making nearly an east course, with look-outs and the lead going, until I had run immediately over and around the spot, sailing in various directions a distance of 40 miles, without effect.

"I then made the best of my way for the Triton Bank, with the wind veering and hauling from S. S. W. to S. S. E. and passed the equator on the night of the 3d of November, in long. 17° 40′ W., and continued over and around the locality of that bank until the morning of the 5th, getting casts of the lead during the time from 50 to 250 fathoms, up and down, without finding bottom. I have, in our search, fully satisfied myself, and hope our examination will prove equally so to you, and all others, that these shoals do not exist."

ST. PAUL'S ISLETS, lat. 0° 55′ 30″ N., long. 29° 22′ 30″ W.—These islets were surveyed by Captain Fitzroy, of H. M. S. Beagle, in 1832.—See plan published by Admiralty, 1841.

Captain Fitzroy, from his observations, places the summit of the Penedo in latitude 0° 55′ 30″, and longitude 29° 22′. The variation here, on the 16th of Feb., 1832, was 9½° W. Temperature of the air and water, 82°. Wind S. E. The rocks were seen on the horizon at sun-set of the 15th. They appeared extremely small at about 8 miles distant. At day-light next morning two boats were seen to land upon and examine them, while the Beagle sailed round, sounding and taking angles. Good observations were made during the day, as the sky was clear and the water smooth.

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The multitude of birds which covered the rocks was astonishing, and they suffered themselves to be kicked about and killed with sticks; at the same time those on the wing even darkened the sky. While one party were scrambling over the rock, a determined struggle was going on in the water, between the boats' crews and sharks. Numbers of fine fish, like the Groupars (or Garoupas) of the Bermuda Islands, bit eagerly at baited hooks put overboard by the men; but, so soon as a fish was caught, a rush of voracious sharks was made at him, and notwithstanding blows of oars and boat-hooks, the ravenous monsters could not be deterred from seizing and taking away more than half the fish that were hooked.

At short intervals the men beat the water with their oars all round the boats, in order to drive away the sharks; and for a few minutes afterward the groupars swarmed about the baited hooks, and were caught as fast as the lines could be hauled up, —then another rush of sharks drove them away;—those just caught were snatched off the hooks; and again the men were obliged to beat the water. When the boats returned they were deeply laden with birds and fish, both welcome to those who had been living on salted provisions.

"From the highest point of the rocks, which is 64 feet above the sea, no discolored water, nor any breaking of the sea could be discerned, apart from the place itself; and from the soundings taken in the boats, as well as on board the ship, I conclude that it is unconnected with any shoal, being merely the summit of a steep-sided mountain rising from the bottom of the ocean. A slight current was setting to the westward, not amounting to a mile an hour."

BLAESDALE'S REEF, in about 0° 57′ N., and 41° 6′ W. —On the 15th of October, 1819, the brig Richard, of Ulverston, Captain Blaesdale, struck on a coral reef, in about 0° 56′ or 0° 57′ N., and longitude, by account, beyond 41° W. In fine moderate weather, the ship going at the rate of three knots, at 6 p. m. grounded, and remained fast about ten minutes. The water was smooth, and no breakers seen. Upon sounding, a few minutes after, no bottom could be found at 125 fathoms. The vessel drew 11 feet of water, and in one hour there were 18 inches of water in the well. On a subsequent survey at Para three holes were found, each about the size of a man's hat, and nearly through the vessel's bottom, and several large pieces of white coral, as large as a man's hand, were found sticking in different parts.

LE HUBY'S REEF, 0° 4′ N. to 0° 9′ S., about 44° 44′ W. longitude.—Extract from the Journal of Captain Le Huby, of the brig Les Jumeaux: *(Naut. Magazine,* 1839.)

"Sailed from Maranham for Guadaloupe on the 30th October, 1838, at 2h. a. m.—On the 1st Nov., at 7h. 30m., the wind being

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easterly, with light breezes and fine weather, I perceived ahead of the ship a remarkable change in the water, which had become a whitish green, with a chopping rippled appearance, and breaking in the direction of our course, which was then N. by W. The ship was surrounded by eddies, and the large spots of discolored water made me conclude that I was on a shoal, causing me some uneasiness on account of our position. At 8 o'clock I sounded in 19 fathoms, rocky bottom. Continuing the same course, and under the same circumstances, the ship going two knots, at 9 sounded in 21 fathoms, coral bottom; at 10 sounded in 23 fathoms, the same bottom; at 11 sounded in 28 fathoms, the same bottom; at 12h. 20m. p. m., after an observation for latitude, sounded in 32 fathoms; at 1 o'clock sounded in 90 fathoms. The sea became smooth, and re-assumed its natural color.

"Latitude at noon, by a very good meridian altitude, 0° 4′ N. The longitude, determined by a good set of observations taken at 9 o'clock with a chronometer of Breguet, gave at noon 47° 4′ W. of Paris."

From this it appears that the shoal over which I had passed extends from 0° 9′ S. to 0° 4′ N., in a S. by E. and N. by W. direction; and from my examination of this spot, the sea being much agitated, and breaking at intervals in a N. E. and S. W. direction, I think that the shoal may be a continuation of the Vigia Manoel Luiz, and the breakers seen by the Portuguese Captain da Sylva.

Without being able to ascertain whether it was so shoal in any part as to bring any vessel up, it must be dangerous in bad weather from the violence of the sea. My first cast of the lead was at 50 miles N., 33 W. of the Vigia Manoel Luiz, the position of which has been determined by Admiral Roussin.—*Annales Maritimes.*

DELAWARE SHOAL, eastward of Trinidad.—Captain Ross, in the brigantine Delaware, from Charleston, on the 16th Sept., 1839, at noon, in lat. 10° 38′, struck soundings in 37 fathoms, shells and sandy bottom. At 3 p. m., steering south, passed over a rocky bank, having 5, 7, and 10 fathoms, and bottom plainly seen: inferred from the distance run that the latitude of the shallow part of the bank must lie in lat. 10° 37′ N., long. by chronometer 60° 3′ W. At 3¼ p. m had 70 fathoms of water.

MARTIN'S REEF, eastward of Guadaloupe.—A letter received at Lloyd's from their agent at Antigua, dated June 7th, contains the following: (*Nautical Magazine*, 1842.).

"Captain Newbold, of the brig Transit, on her passage from Halifax to St. Vincent, in February last, discovered a shoal to windward of this island, in lat. 16° 42′ N., long. 59° 6′. He examined it as carefully as circumstances would permit, and describes it to be about 200 feet long and 80 feet wide, with three fathoms water in the centre, and much shallower on the edges."

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Relative to the foregoing we have received the following observations:—

In the last edition of Purdy's "Atlantic Memoir," p. 451, the same shoal is described under the name of "Martin's Reef," in about 16° 42′ N., and 58° 45′ W. as follows:—"A shoal was inserted hereabout on the chart of Bellin, 1742, who says it is mentioned by many navigators. It was again seen in July, 1816, by Captain Martin, of the ship John Manning. The shoal seemed to consist of yellow sand with sea-weed upon it; to be about half a mile in length from east to west, and a quarter of a mile in breadth from north to south."

And, also, that the reef was again seen by the ship Cecilia, of Glasgow, 19th of July, 1823, by which the position assigned was 16° 44′ N. and 58° 50′ W. To the commander of this ship it appeared to be about 1½ or 2 miles long, and only about 30 feet wide; the western part, shaped like the bulb of a thermometer, seemed dangerous."

CLOWE'S REEF, to the northward of Porto Rico, lat. 19° 17′, long. 65° 50½′.—An American schooner, in 1817, struck on a rock to the northward of Porto Rico, in between 19° and 20° North. This was, probably, the same danger on which, some time after, the brig Robert, Captain Baxter, struck, and remained several hours. The reef, which has been variously represented on the charts, was seen by Captain Clowes, in the ship Caledonia, on the 24th of April, 1825; and Capt. C. assigns for its situation lat. 19° 17′, and long. 65° 50½′. It is about a quarter of a mile in extent from east to west, with very little water on it. A quantity of sea-weed was seen at each end, which appeared to be drifting to the S. W. The ship was within a mile of the reef.

ST. ESPRIT REEF *does not exist.* It was searched for by order of Sir George Cockburn, by H. M. ships Ariadne, Sapphire, Vestal, Forte, and Victor, in 1834, and could not be found. See Plan, in Naut. Mag., Nov., 1834.

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ICE IN THE NORTH ATLANTIC.

BY W. C. REDFIELD.

Of the various dangers which beset the path of the mariner, perhaps there are none which excite to more vigilance than the known or expected proximity of ice. In some frequented portions of the Atlantic Ocean the ice appears almost every year, in the various forms of field ice, floes, and massive ice-islands, drifted from the arctic regions by the constant action of the polar currents. These ice-bearing currents, in flowing towards the south, must necessarily incline towards the western limits of the ocean, owing to the increased velocity of the diurnal rotation of the earth's surface as we depart from the poles; a law well understood as regards the currents of *air* which form the trade winds. Hence it is that on and near the Banks of Newfoundland these ice-currents are found to cross the usual track of vessels bound from the ports of Europe to Northern America.

The quantity of ice which appears on this route of navigation in different years, is exceedingly various. It is sometimes seen as early in the year as January, and seldom later than the month of August. From March to July is its most common season. It is found most frequently to the west of longitude 44°, and to the eastward of longitude 52°; but icebergs are sometimes met with as far eastward as longitude 40°, and in some rare cases, even still further towards Europe.

Experience has shown that the proximity of ice is far less hazardous than rocks and shoals; and this floating danger would be still less formidable were it not for the fogs and mists which it often causes. The *thermometer* has been often held up as affording sure indications of an approach to ice, by the reduction of temperature shown both in the air and water, and these indications are important, and should by no means be neglected. But there may be many cases of approach to ice where a reliance upon the thermometer alone could not afford security.

On the ice chart, which is annexed, we have indicated numerous positions in which ice has been seen and reported on the common route of navigation, chiefly since 1832. This will serve to show the region where it is most often encountered.

Although little or no ice be seen in one passage, or even in many times crossing the Atlantic, yet it has been frequently met in such quantities as seemed to indicate a vast, or indefinite extention of the ice-fields, towards the polar seas. And from the inexhaustibility of the sources of supply, and the permanent character of the polar currents, we may infer that there is no spot of ocean within the influence of these currents which has not, at some time, been covered with ice.

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A recital of the various authorities and marine reports from which our ice-chart has been compiled, might prove more tedious than useful. The following, however, selected from many others, may serve as examples of the cases in which the ice has been noticed by navigators.

Ship Eli Whitney, Harding, April 7, 1836, sea account: wind S. S. W. and thick fog; ordered the temperature of the water to be tried every half hour; at 6 p. m. water 36°; passed a small ice island; ship going west all night three knots; 6 a. m. water 34°; at 8 a. m. water 31½°, passed considerable quantities of ice. At 10 a. m., saw a large field of ice ahead, which extended to the north and south as far as the eye could reach; entered it in expectation of finding an opening to westward. After proceeding a cable's length, wore round and stood out as we went in, and then hauled the ship on the wind to the S. E. Longitude by account, 47° 06′ W., latitude by account, 44° 41′ N.—April 8, wind S. S. W., stood to the S. E. till 5 a. m.; water 46°; tacked ship to the westward. At noon water 44°, lat. by observation, 44° 35′, longitude by chronometer, 46° 56′.—April 9, wind S. S. W. and foggy. At 4 p. m. water 34°; wore ship to the S. E. At midnight water 44°; tacked ship to the westward. At 8 a. m. wind shifted N. W. and cleared off the fog; three large islands of ice in sight; water 44°; latitude by observation, 44° 17′ N., longitude by chronometer, 47° 50′ W.—April 10, wind N. W.; passed six large islands; water in vicinity of the ice 40°, latitude by observation, 43° 09′, longitude by chronometer, 48° 55′.—April 11, passed four large islands of ice this day; at 8 a. m. sounded and found bottom with 42 fathoms; water 35°; latitude at noon by observation, 43°; longitude by chronometer, 50° 36′ W.

Ship Samuel Wright, Allen, March 18, 183–. Latitude 43°, longitude 48° 43′. At 3 p. m. very foggy, came nearly in contact with a very large island of ice, about 150 feet high and one mile in length: the weather extremely cold, kept the ship under easy sail. At 5 p. m. fell in with an English brig, and were informed we were standing for more ice, and that she had been for five days surrounded with it, extending from latitude 45° to 43°, and found no opening to the westward. Kept company during the night, and fell in with more ice; in the morning no ice in sight.

Ship Fama, Winsor, March 183–, in latitude 44° 30′, longitude 48°, fell in with an immense field of ice; tacked ship to the eastward and stood off and on two days. Wind changed to N. E. and run 45 miles S. W. and passed the point of ice in latitude 43° 25′, longitude 48° 50′.

The British Tar, Hanby, left the Gulf of St. Lawrence 29th June, and passed through the Straits of Belle Isle. On the 3d of July, about 15 miles eastward of Belle Isle, found the pas-

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sage quite blocked up with very heavy fields of ice, which obliged us to put back to an anchorage. On the 6th again made the ice, and found it more open: passed through about seventy miles of it. On the eastern edge, fell in with nine brigs, a ship and a barque, standing off and on, waiting for a passage into the Straits. The icebergs were very numerous and immensely large, as far to the eastward as longitude 48°.

Ship Oneida, Funk, May 4th, 1841, latitude 43° 40′, longitude 50°, passed a number of large icebergs; saw ice as far west as longitude 53°.

The brig Anne, of Poole, William Dayment, master, sailed from Greenspond, Newfoundland, [N. E. coast,] 19th of January, 1821, and in the evening encountered several floating islands of ice. On the following morning, at sunrise, the ship was so completely enveloped in ice that there appeared no means of escape, even from the tops of the masts. The ice, in its whole extent, rose about fourteen feet above the surface of the water; it drifted towards the southeast, and bore the ship along with it twenty-nine successive days. On the 17th of February, Capt. D. being three hundred miles east of Cape Race,* in latitude 44° 37′ north, perceived an opening to the southeast, and succeeded in disengaging himself. From the 29th of January to the 3d of February, the brig only made four miles a day; and during the 29 days this navigation lasted, he descried near one hundred very extensive mountains of compact ice.

Ship Isabella, Meredith, struck an iceberg on 9th May, 1841, in latitude 42° 2′, longitude 43° 45′. The iceberg broke through the bows, and caused the ship to fill with water so fast that the crew had barely time to take to the boats, without water, provisions or clothing: the ship immediately went down, or disappeared in the fog. The crew continued in the boat until the afternoon of the 11th, when they were picked up by the Kingston, of Hull, bound to Pictou.

Ship Lowell, on the 10th of March, 1842, at 9 a. m., latitude 44° 15′, longitude 48° 30, came in contact with a field of ice; was at that time steering W. N. W., with the wind. Tacked and stood to the eastward two hours, when she again tacked to the westward. At 2 a. m. again fell in with the ice. Continued beating to the southward and falling in with the ice on the west tack till March 13th. Passed the southern extremity of the field in latitude 42°, longitude 49° 15′, having seen it extending in a N. N. E. and S. S. W. direction, nearly 150 miles.

A letter from Capt. Hosken, of the steamship Great Western, says: "April 18th, 1841, the ship steering west, at 6 p. m. first saw one iceberg on the starboard bow, at 7 30 passed it; at that time four or five others in sight; at 9 15 p. m. passed several

* That this position was ascertained by chronometer appears doubtful.

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small pieces of ice—slowed the engines. In a few minutes after, the ship was surrounded with light field ice, which appeared similar to a field I ran through on the 11th of February, 1839. This induced me to go slowly, with the hope of getting through, as I had done on that occasion; but by 9 30 finding it closely packed, and much thicker, prudence dictated our escape by the same channel we had entered. I then stopped and attempted to get the ship's head to the eastward, by turning ahead and astern until there was room for her to come round; in the course of this operation the ship had occasionally (at least) two streaks heel given by either wheel passing over large masses of ice. At 10 15, succeeded in getting the ship's head to the eastward, and by 11 p. m. entirely clear. From that time went slowly, passing several icebergs; the night at times very clear, the aurora borealis very bright. At 3 30 a. m. of the 19th, again got embayed in the ice; stopped, hauled short round on our keel, and steered out E. by S., coasting the ice for five or six miles. At 4 20 kept her to the westward, running through innumerable icebergs until 8 30, when we passed the last iceberg and field of ice."

"When the sun arose the ice was visible as far as the eye could reach, in an unbroken line from N. E. by E., by the northward to N. W. by W.; at the same time, icebergs innumerable in every direction, forming one of the most magnificent sights I ever beheld."

"The first iceberg we saw was in latitude 43°, longitude 48° 30′; and the last in latitude 42° 20′, longitude 50°. I am quite sure there was an unbroken field of that extent; and from what I heard from Capt. Bailey, of the packet ship South America, I have no doubt the field ice extended, with very little break, to latitude 40° 30′, where Capt. B. fell in with it on the morning of the 18th. Several other ships also fell in with it in the same longitude, and were completely stopped, giving them an opportunity of killing seals, which were on it in great numbers. Some of the icebergs I estimate at little, if at all less than a mile long, and from one hundred and fifty to two hundred feet high. This field of ice was in large masses, some of them not less than twenty feet square by six feet thick or more."

"The temperature of the water, when within two miles of the first iceberg seen, fell suddenly from 50° to 36°: air 40° to 36°. When in the ice, the water was 25°, air 28°; during the remainder of the night and following morning the water was not higher than 30° nor the air higher than 32°. Immediately after passing the last ice the water became 36° and the air 42°."

Brig Cynosure, on the 23d, 24th, and 25th of July, 1842, latitude 42°, longitude 49° 30′, saw large icebergs, and was two days among the ice. Saw an island of ice that was estimated to be two hundred feet above the water, and saw several other islands in longitude 54°.

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Ship England, Bartlett, April, 1842, latitude 41° 29′, longitude 49°; saw a large number of icebergs.

Brig Byron, Pierson, April, 1842, latitude 41° 18′, longitude 50°, saw four large islands of ice, one about 200 feet high and three miles long. Saw it 30 miles off.

British brig Peace, Robson, May 9th, 1844, made the ice in latitude 46° 52′, longitude 46° 30′, being bound to the Gulf of St. Lawrence, and was soon so completely imbedded in a large field of fragment that escape was impossible. She remained fast until the 13th, without injury, when in the night a gale of wind set in, crowding the large cakes down fast upon the sides and bulwarks of the vessel, which, from being in ballast, was soon stove in by the immense weight. On the 14th the small boats were got out and stocked with provisions, &c., and in the night of the same day the brig was abandoned. Captain R. with crew and boats remained upon the ice until the 18th, being unable to get into clear water, and on that day were taken off, in latitude 46° 50′, longitude 45° 42′, by the ship Copernicus, after much suffering.

Ship Burgundy, Wotton, in May, 1844, from the latitude 45° 30′ longitude 45°, to latitude 43° 30′ longitude 48°, was completely surrounded by icebergs and drift ice; lay to four nights, owing to the density of the fog; saw an iceberg two miles in length; no ice seen on the Banks.

Ship Virginia, Allen, latter part of January, 1844, was 34 hours fast in the ice. On the Banks, in a hurricane, lost foresail and main-topsail—saw large quantities of ice.

Ship Swanton, Heath, from 18th to 21st July, 1842, experienced thick foggy weather, latitude 43° and longitude 49° to 54°, passed upwards of 300 icebergs, some of them very large; came near being wrecked on them, having run between two large islands in the night, which nearly rubbed the ship on each side before we discovered them, notwithstanding all hands were upon the lookout.

Captain William Wier, bound eastward, gave the following account. On the 9th of March, 1787, latitude 42° N., longitude 55° 40′ W., was called by the mate to see a large ridge of breakers: altered my course from E. S. E. to S., the appearance of breakers being N. N. E., and trending from E. N. E. to W. S. W. March 11th, latitude 43° 34′, found myself in the midst of a large body of ice, trending E. N. E. and W. S. W.; soon got through. March 13th, latitude 44° 03′, at 8 a. m., made a large body of ice, extending beyond view from mast-head, and trending N. E. by E. and S. W. by W. At 10 p. m., met a larger body of ice, which entirely stopped the ship's way. On the morning of the 14th, found myself enclosed, and could see no water from mast-head, except one small hole, into which I pressed the ship; in 23 fathoms water on the Grand Bank. In this dismal

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s tion lay with my sails hauled up, till 21st March, seeing no sea from main top-gallant-mast head. On the 17th went on the ice to take a view of an island of ice which bore from us W. S. W. We set out at 12 o'clock, and travelled one hour and thirty-five minutes before we reached it. We found it aground in 25 fathoms, the main body passing fast by it, setting S. E. two and a half miles an hour, as I judged. On our return, having been absent three hours, the ice island bore W. N. W., having altered four points.

On the first day of January, 1844, Captain Burroughs, in the ship Sully, met with an iceberg in the Atlantic, in latitude 45°, longitude 48°. This is earlier in the winter than any other case which we have met with. Captain B. states that he had met with ice near this position on the first of February, on a former voyage.

In September, 1822, Capt. Couthouy saw an iceberg aground on the eastern edge of the Grand Bank, in latitude 43° 18′, longitude 48° 30′. Sounding three miles inside of it, the depth was found to be 105 fathoms. In the month of August, 1827, the same observer, while crossing the Banks in latitude 46° 30′, longitude 48° W., passed within less than a mile of a large iceberg which was stranded in between 80 and 90 fathoms water. He was so near as to perceive, distinctly, large fragments of rock and quantities of earthy matter imbedded in the sides of the iceberg, and to see, from the fore yards, that the water for at least a quarter of a mile round it was full of mud, stirred up from the bottom by the violent rolling and crushing of the mass.

On the 27th of April, 1829, Captain Couthouy passed, in latitude 36° 10′ N., longitude 39° W., [probably south of the Gulf stream,] an iceberg, estimated to be a quarter of a mile long, and from 80 to 100 feet high. It was much wasted in its upper portion, which was worn and broken into the most fanciful shapes. In 1831, at daylight of the 17th of August, latitude 36° 20′ N., longitude 67° 45′ W., upon the southern edge of the Gulf stream, he fell in with several small icebergs, in such proximity to each other as to leave little doubt of their being fragments of a large one, which, weakened by the high temperature of the surrounding water, had fallen asunder during a strong gale which had prevailed from the southeast.*

Ship St. James, Meyer, July 12, 1844, latitude 44°, longitude 47° 12′, passed 12 large icebergs; July 20, passed 25 do.; and July 21, passed 30 do.; latitude 43° 50′, longitude 52° 26′, saw the last of it.

John L. Hayes, Esq., in the Boston Journal of Natural History, states that Capt. Crocker, of New Bedford, measured with his sextant an iceberg which was aground on the Bank of New-

* See Silliman's Journal, Vol. XLIII, 1842.

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foundland, and found it to be half a mile long and two hundred and forty-four feet high. Also, that Captain Matthew Luce, of New Bedford, saw an ice island of one hundred feet in height, aground in forty-eight fathoms, on the Bank, and that the fishing vessels had sailed around it for thirty days.

Ship Switzerland, Knight, May 5th, 1844, in latitude 47° N., longitude 46° W., at 5 a. m. met with a perfectly solid field of ice, and the wind being N. E. hauled out to S. E. After coasting the ice forty miles, found it turned to E., and that the ship was embayed. Tacked to N., and after four tacks of one hour each, the wind hauled to S. W.; steered east a short distance from the ice. Afterwards turned to the south, and the wind hauling to the westward, steered S. S. W. for forty miles more, when the ice became broken, and very soon was entirely clear of it, having sailed eighty miles along an unbroken coast of ice, exactly in appearance like low land covered with snow. The wind continuing to the westward, saw more or less ice for three following days, but none south of latitude 44° 43′, nor west of longitude 49°.

Ship Formosa, Crawford, June 18th, 1842, latitude 38° 40′, longitude 47° 20′, saw an iceberg 100 feet high and 170 feet long.

On the passage out in the Acadia, on the 16th of May, in latitude 46°, longitude 47°, there were seen about 100 icebergs, some of them of large size, and one from 400 to 500 feet high, bearing so strong a resemblance to St. Paul's that it was at once christened after that celebrated cathedral. The dome was perfect, and it required no extraordinary stretch of imagination to supply the turrets, pinnacles, and other parts of the building. On the homeward passage of the Acadia, on the 6th of June, the same object was seen, and the immediate exclamation on board was, "There's our old friend, St. Paul's." In the interim between the two views, the iceberg had drifted about seventy miles.*

An immense ice island was seen on the 10th July, 1841, in latitude 43° 54′, longitude 58° 12′, by Captain Ricker, of the Apollo, at Boston. He reports that his thermometer fell when near it forty degrees.

It may be proper to state here, that many ice observations have been placed on the chart without a reference to the date or the vessel which reported them, and the want of room for the references has rendered this in a degree unavoidable. In compiling the chart, one hundred and fifty-seven separate reports have been consulted, the general character of which may be estimated by the foregoing examples. Many other accounts might have been obtained, but it is believed that these are sufficient for an approx-

* English paper.

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imate estimate of the course and positions of the ice in various seasons, so far as relates to the routes of vessels coming from European ports.*

On the Westerly tendencies of the Polar Ice-currents, and their Influence on the Gulf stream.

In further noticing the westerly and southerly progress of the cold currents from the arctic regions, we avail ourselves of the researches of Rennell, who states that "a current from Greenland and the Arctic sea joins the Gulf stream on the east of the Grand Bank of Newfoundland, somewhere about latitude 44°, and between the meridians of 44° and 47°. In the month of May its direction has been found to be between S. W. by S. and S., and its temperature [apart from the ice] 43° to 47° of Fahrenheit. The temperature taken not far to the eastward of it was 62° to 63°, and an easterly current of 30 miles [per day] of the same water (i. e. gulf water,) was found at a distance from the eastern edge of the S. W. by S. cold stream. This is, doubtless, the current that brings down the ice from Greenland, &c., to the east of the Bank of Newfoundland, and ice has been seen in the line of this very current, by different persons in different years. The navigators to Newfoundland and New England place the junction of these currents in about latitude 41°, longitude 49°, which shows how erroneous their ideas are on this subject."

Rennell likewise states that "there is also a smaller [?] current that passes down the coast of Labrador, and eastern side of Newfoundland, and carries ice in sight of the coast." He also says, that "it appears both from *his own* and other people's observation, that two distinct streams of ice exist; one on the east of the Bank, the other ranging along the coast of Labrador and Newfoundland; and then obliquely across the bank in a S. by E. direction; whilst that from Greenland, &c., runs between S. by W. and S. S. W. This last current appears to fall into the Gulf stream about the latitude of 43° or 44°; and between the meridians of 45° and 50° W. The ice is, of course, carried into the Gulf stream, where, from the warmth of its temperature, it must rapidly dissolve."† Rennell also states that many ice islands

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* Much ice has been met during the present year (1845,) but in no unusual positions. It is hoped that ship-masters will report the exact positions of the ice when seen, particularly if the position is far south or west, or is otherwise remarkable.

†I have not sufficient knowledge of that portion of the Greenland current which lies north of the Banks, to enable me to determine if its course from the coast of Greenland be directly towards the Flemish Cap and the eastern side of the Grand Bank, or whether it may not fall in with the Labrador current

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are found to the westward of the above, "in the line of the route from Halifax," and that "they are often seen in the Strait of Belle Isle." We quote also the following:

"An experienced commander, long in the Newfoundland trade, has said that the branch current which appears to come from Hudson's Bay, always sets to the south-westward (perhaps S. S. W.,) off the eastern coast of Newfoundland: sometimes at the rate of two miles an hour; its strength, however, varying with the direction and force of the wind. Passing down the eastern coast of Newfoundland, it turns about Cape Race, and sets thence along the south side of the island, until it meets with the current from the St. Lawrence, [through the Strait of Belle Isle,] a little to the westward of St. Pierre and Miquelon Islands.

"When the Virgin Rocks, lying about 80 miles W. by S. from Cape Race, were surveyed in July, 1829, the current set over them to the W. S. W. at the rate of one mile an hour.

"It is probable that this westerly current impinges on the easterly one, and continues its course, with diminishing velocity, towards Breton Island, where it blends with that branch of the St. Lawrence stream which sets to the S. W. between Sable Island and Nova Scotia.

"The sea between the Grand Bank of Newfoundland and the Banks of Nova Scotia is distinguished by its drifts of *cold* water, varying with the wind and seasons."*

In further proof of the westwardly pressure of the polar current upon the American coast, we may state, on the authority of Captain Bayfield, the able officer who surveyed the Gulf and River of St. Lawrence, that "in spring the entrance and eastern parts of the Gulf are frequently covered with ice, and vessels are sometimes beset for many days;" and that "the reality of a current inwards through the Strait of Belle Isle, is confirmed by the presence of icebergs, which it transports into the Gulf in summer, against the prevailing S. W. winds, frequently carrying them as far as Mecatina, and sometimes even to the neighborhood of the east point of Anticosti." This last position is nearly 300 miles from the entrance of the strait, and almost half way to Quebec.

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in longitude 48° to 51° off the Strait of Belle Isle, or the southern coast of Labrador, running from thence southeasterly parallel to the coast of Newfoundland and outside of the Labrador current, carrying with it the belt or stream of ice which it brings from the Greenland seas. It is hoped that this point may be satisfactorily determined, and in the mean while I have ventured to indicate on the ice-chart, hypothetically, the more direct route to the eastern ice region, as being that of the Greenland current.

The Labrador current must be viewed as a *deflected current*, till it has passed Newfoundland, being turned to a course which is east of S. by the lay of the land. W. C. R.

* Purdy, in Rennell.

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But even stronger proof of this inward pressure of the cold current into the gulf and estuary of St. Lawrence is found in the icy temperature of its deeper waters during the summer. Thus, in the middle of the estuary, off Matan, and more than 200 miles above the east point of Anticosti, on the 8th of July, Dr. Kelly found the temperature of the surface water 60°,—at 30 fathoms 35°,—at 50 fathoms 34°: the whole depth at that point being 132 fathoms. A subsequent trial in this portion of the river showed the surface water at 57°,—at half a fathom depth 44°,—5 fathoms 40°,—10 fathoms 38,—100 fathoms 35°. At Tadousac, about half way to Quebec from the place of the last observation, Dr. Kelly found the temperature, in September, as low as 36°, after an easterly gale, which mingles the shallow stream of the surface with the deeper waters. Numerous other observations made at different times and places, during the survey, confirmed these results. Hence it appears that the drainage waters received by the rivers were discharged by means of the surface current, which swept over the cold subjacent waters that were brought in by the polar current and the flood tide. These facts should be remembered in viewing the relations of the polar currents to the Gulf stream.

In relation to the southern outlet of the Gulf of St Lawrence, it has been common for navigators and others greatly to overrate the proper *river* current of the St. Lawrence, in its extension southward of Breton Island and Nova Scotia. This fresh-water current, when compared with the branch of the polar current which joins it through the Strait of Belle Isle, is but of insignificant volume; and the current through this strait, in its turn, is but an ocean rill, when compared with the great volume and force of the cold currents which pass to the eastward and southward of Newfoundland.

It appears that Rennell was embarrassed in his investigation of the polar currents of this region, by admitting the assumption that a portion of the cold water, eastward of Newfoundland, was caused by the Bank itself. This hypothesis had been sanctioned by distinguished writers, but the observations and facts on which it was founded can now be satisfactorily explained by the admitted influence of cold currents, either superficial or sub-aqueous. He appears, also, to have viewed the Gulf stream as opposing a direct obstacle to the further passage of the polar currents, but it appears to us, that the streams of existing aqueous currents are found intersecting each other, much in the same manner as they would pass through quiet waters, and that they quietly impose or imbed upon each other like as stratified currents of air, or lateral currents from the forks of rivers, are found to accommodate each other, in their respective courses. In these river cases, as apart from the extraneous deflection by the shores,

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while the original momentum of each stream continues, one of these may be borne away from its original course, and thus be resolved to a new or modified direction by the further progress of the current in which it is imbedded; but in such cases, a diversion of the course of the lower current does not usually take place.

In the case of ocean ice-currents which intersect a surface cross current, while the common *surface ice* conforms more or less nearly to the new direction of the current on which it floats, the deeply immersed ice masses, having probably their greatest bulk immersed in the lower or deeper current, are thus resolved, by a real conflict of impelling forces, into a still different course, which conforms more or less nearly to that of the lower or subaqueous stream, according to the respective areas exposed to the action of the two currents, and their respective velocities. The geographical course of the body of the Gulf stream, according to our best information, commonly touches the southern point of the Grand Bank in latitude 43° N., but the overflow or outspreading portion of the stream often sweeps over the southern part of the Bank, as a surface current, when unimpeded by the ice. When the ice appears in great quantities it is probable that the Gulf stream current coming from the west, carries the ice more eastwardly, from its previous southwesterly course. In thus yielding to the joint influence of the two currents, the surface ice assumes a new direction, towards the south or southeast.

Grounded icebergs, when quite stationary, afford the best means for observing the course of the common ice-fields. The course of the ice-drift, within the influence of the Gulf stream, doubtless varies at different times and localities, and must be greatly influenced by the depth of the floating masses. For in the case of icebergs or islands, particularly those which come down from the Greenland seas and pass eastward of the Grand Bank, their great depth subjects them to the continued impulsion of the lower or arctic current after they arrive within the influence of the Gulf stream, the main part of the cold current passing beneath the warmer one, by means of its deeper position as well as greater specific gravity.

This may be shown from the cases before recited, of immense icebergs which have been impelled into the body of the Gulf stream, where, instead of being drifted off to the eastward, in conformity with its course and with the like tendency of the prevailing winds, some of these floating islands have been forced across the body of the stream, and in some cases even far beyond its ordinary limits, to a latitude lower than that of the southern boundary of Virginia; as shown in the two cases given by Capt. Couthouy. The most eastward of these, in longitude 39°, and

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south from the usual eastern limits of the Greenland icebergs that arrive in the latitude of the Banks, was near seven degrees lower in latitude than the southern extremity of the Grand Bank. The other icebergs noticed by him, in like latitude, and longitude 67° 35′, probably passed near to Newfoundland, and their position shows, in a more striking manner, the strong westwardly tendency of the polar current.

No impulsion but that of a vast current, setting in a general southwesterly direction and passing beneath the Gulf stream, could have carried these immense bodies to their observed positions, on routes which cross the Gulf current in a region where its average breadth has been found to be about two hundred and fifty miles.

The continued southwestern, and even more westwardly course of that portion of the polar current which is found southward of Newfoundland and Nova Scotia and west of the Gulf stream, is conclusively shown by the two icebergs met with by H. M. packet Express, July 7, 1836, on the southern edge of the Sable Bank, about seventy-five miles southwest from Sable Island. The highest of these, estimated at 180 feet, was in latitude 43° 14′, longitude 61° 17′, the other, 150 feet high, in latitude 43° 09′, longitude 61° 26′. Owing to the great depth of these ice islands, they could not have passed through the Strait of Belle Isle, but must have been carried by the main current eastward and southward of Newfoundland to their observed position, which, by the nearest course, is near 500 English miles from off Cape Race, the southeast point of that island, in the direction S. 63° W., true meridian, or W. S. W. ½ S. Of the further extension of this portion of the polar current, in diminished force, along the coast of the United States and the western border of the Gulf Stream, as far as Cape Hatteras, if not to Florida, we have formerly spoken, in another place.*

The finding of a low temperature on the southern part of the Grand Bank, or even to the southward of latitude 43°, is not sufficient evidence of the entire absence of the Gulf stream current: for the recent presence or proximity of floating ice must necessarily cause a great reduction in the surface temperature, and there is no natural process by which the cold water of the surface stream can be changed for warmer with a rapidity sufficient to preserve a temperature at all corresponding to the warm portions of the Gulf stream.

It is well known that vessels in the northern part of the Gulf stream, while steering parallel to its general course, have met with successive and striking changes in the temperature of the water, and sometimes with ice, to the southward of Nova

* Silliman's Journal, vol. xxxii, page 349.

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Scotia and Newfoundland, and in the proper line of the polar current. This is well shown in the journals of the ships Eliza and Grand Turk, as published in some former editions of the Coast Pilot. In latitude 41° 53′, longitude 56° 52′, the Eliza found the water at the depth of 70 fathoms two degrees warmer than that at the surface, the temperature of the latter being 40°, and an ice island bearing S. S. E., distant seven miles. S. S. W. and S. of the Grand Bank, and in nearly the above latitude, the Eliza again met with cold water, and passed several ice islands. Rennell has also recognized these cold veins or bodies of water in the Gulf stream. It appears, therefore, that in this portion of the Gulf stream, neither its presence nor its actual limits can be determined with certainty by the thermometer, during the ice season.

It appears in the pages of the Coast Pilot, that Capt. Billings, in June, 1791, found the temperature of the water in the Gulf stream to have fallen 10 degrees, in latitude 39°, southward of the Bank, and that the like had been observed by Dr. Franklin and Col. Williams, in the same region. But, judging from the latitude, it is not improbable that these observations were made to the *southward* of the true border of the Gulf stream. If this be the true solution, it is indicative of the partial re-appearance of the polar current, after passing beneath the Gulf stream; and there is evidence of its further course to the southwest and W. S. W., near the border of the stream.

This leads us to notice a probable, if not a principal cause of the great variations, which have been reported, in the position and limits of the Gulf stream, in its eastward progress. Rennell, we conceive, rightly supposes an *overflow* or outspreading of the Gulf stream upon the ocean waters, as it proceeds in its course. Now we know, from well established cases, that overflowing streams, upon denser waters, are often very shallow; and Captain Bayfield has shown, in the case of the estuary and Gulf of St. Lawrence, that the effect of a storm is to break up, for the time, this superficial current, and amalgamate it with the deeper and colder waters. Hence we may infer, that in good weather and a smooth sea, the thermometric breadth of the Gulf stream may be far greater than in rough weather; and that it is most straitened in its limits immediately after the occurrence of a great storm.

Perhaps too little consideration has hitherto been given to the character and effects of the polar currents. These appear to be well worthy of the attention of both the navigator and the philosopher. We have seen that the moderate but unceasing flow of these currents often interposes an icy barrier in one of the most common routes of navigation. The observing geologist will also discern in the courses of the great ice-currents of the Atlantic,

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both before and after their contact with the tropical stream, a striking coincidence with the directions of the two systems of striæ which mark the abraded surfaces of the continental rocks; the origin of which must be referred to the early and prolonged period when these rocks were situated beneath the ceaseless flow of the ocean currents.*

New York, September, 1845.

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*Silliman's Journal, vol. XLIII, page 152—vol. XLV, page 326.

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